RECORD OF PERSONAL INTERVIEW UNDER 37 C.F.R. § 1.133(b)

A telephone conference was conducted on November 14, 2008 between Applicant's representatives Eric Raciti and Biju Chandran, and Examiner Teresa Walberg to discuss the Office Action mailed August 18, 2008 ("the Office Action"). During the interview, the following items were discussed: the combination of Batchelder and Chu for the teaching of "a pump [having an] impeller ... mechanically integrated with the rotor," as recited in claim 70, and the Examiner's assertion on page 7 of the Office Action that it is conventional in the computer cooling art to use AC motors powered by DC power supplies. A summary of the discussions are described in subsequent paragraphs. The Applicant and Applicant's representatives thank the Examiner for taking the time to discuss the Office Action.

Regarding the combination of Batchelder and Chu for the teaching of a pump having an impeller mechanically coupled to the rotor, Applicant's representatives explained to the Examiner that Batchelder's cooling system describes a pump having an impeller magnetically coupled to a rotor in order to maintain the hermeticity of the composite plate that contains the heat transfer fluid. Applicant's representatives further argued that Batchelder expressly teaches against passing a shaft through the composite plate to mechanically couple the shaft to the impeller since the hermeticity of the composite plate would be compromised. The Examiner did not explicitly disagree with Applicant's representatives, but insisted that mechanically coupled impellers and magnetically coupled impellers were known in the art to be interchangeable.

Regarding the Examiner's assertion that AC motors powered by the DC power supply of the computer were common in the art, the Applicant's representatives argued

that if a cooling system pump in a computer is powered by the power supply of the computer, a person of ordinary skill in the art would use a pump having a DC motor since a conventional computer power supply produces DC power. A person of ordinary skill in the art would not be motivated to use an AC motor that is powered by a computer power supply. Applicant's representatives also explained that the specification of the current application describes that, although a person of ordinary skill in the art would use a DC motor in the computer cooling system, the instant claims require an AC motor because of some specific non-obvious advantages of using the AC motor. The Examiner asked Applicant's representatives to include this argument in this Reply to the Office Action.

The responses to the rejections set forth in the following remarks substantially conform to the arguments made during the telephone conference.

REMARKS

In the Office Action, FIGS. 1-3 were objected to for failing to label these figures as prior art. FIGS. 1-3 in the replacement sheets have been labeled as prior art as required by the Examiner. Therefore, it is respectfully requested that this objection be withdrawn.

In the Office Action, the drawings were also objected to under 37 C.F.R. §1.83(a) as not showing every feature of the invention specified in the claims. By this response, FIG. 17 is submitted as a new drawing showing all the features recited in the claims. As described on page 3 of this response, FIG. 17 is supported by the specification. Therefore, it is respectfully requested that this objection to the drawings be withdrawn.

In the Office Action, claims 70-73, 75-84, 87, 101, and 102 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Number 6,019,165 issued to Batchelder ("Batchelder") in view of U.S. Patent Publication US 2003/0056939 A1 to Chu et al. ("Chu") and further in view of U.S. Patent Number 6,114,827 issued to Alvaro ("Alvaro"); claim 74 is rejected under 35 U.S.C. §103(a) as being unpatentable over Batchelder in view of Chu and Alvaro and further in view of U.S. Patent Number 6,580,610 issued to Morris et al. ("Morris"); claims 85, 86, and 88 are rejected under 35 U.S.C. §103(a) as being unpatentable over Batchelder in view of Chu and Alvaro and further in view of U.S. Patent Number 6,668,911 issued to Bingler; and claims 97-100 and 103-112 are rejected under U.S.C. §103(a) as being unpatentable over Batchelder in view of Chu and Alvaro and further in view of U.S. Patent Number 6,170,563 issued to Hsieh.

Applicant disagrees with the propriety of these claim rejections, however, in order to expedite prosecution, Applicant amends claims 70, 73, 78-82, 103, 105, 108, 110, and 111; and cancels claims 97-102. The amended claims find support in the originally filed specification and claims. No new matter has been added. Claims 70-89, 95, and 103-112 are therefore currently pending. Of these claims, claims 70, 103, and 108 are independent.

Rejections of claims 70-73, 75-84, 87, 101, and 102.

Of these rejected claims, claims 101 and 102 have been cancelled by this response. Claims 70-73, 75-84, and 87 stand rejected as unpatentable under 35 U.S.C. §103(a) as being obvious over Batchelder in view of Chu and Alvaro. Of these claims, claim 70 is independent, claims 71-73, 75-84, and 87 depend from claim 70.

Claim 70 recites, in part, "a pump [having an] impeller ... mechanically integrated with the rotor." The Examiner, while admitting that Batchelder discloses a magnetically coupled impeller and not an impeller mechanically integrated with the pump rotor, alleges that it would have been obvious to substitute the magnetically coupled impeller of Batchelder with the mechanically coupled impeller of Chu. Office Action, end of page 4 and beginning of page 5. For the same reasons described in previous filed responses by the Applicant and discussed during the telephone interview with the Examiner, Applicant maintains that such a substitution would make the invention of Batchelder unsatisfactory for its intended purpose, and therefore, there would be "no suggestion or motivation to make the proposed modification." M.P.E.P. 2143.01 V. However, for the sake of speeding prosecution, Applicant has amended claim 70 in this response.

Amended independent claim 70 recites that the "impeller [has] a plurality of curved blades, [wherein] the curvature of the blades [is] configured to increase an efficiency of the impeller when rotating in a predetermined rotational direction," and that the "pump [includes] an AC motor ... [wherein] an AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor." Amended independent claim 70 also recites that "a characteristic of the AC voltage directed to the motor during starting of the motor [is] selected to rotate the impeller in the predetermined rotational direction."

Batchelder discloses a hermetically sealed composite plate 20 containing a heat transfer fluid to transfer heat from a heat generating component 2 to a heat absorbing device 28. See Batchelder, Figs. 2, 5; col. 4, lns. 9-15; col. 4, ln. 63 - col. 4, ln. 11. Composite plate 20 includes an impeller 54 embedded therein. In Batchelder, the impeller 54 embedded in the hermetically sealed composite plate 20 is motivated to rotate, and circulate the heat transfer fluid, by an external moving magnetic field generated by a magnet 56 that is attached to, and rotates with, a shaft coupled to the rotor of a motor. See Batchelder, Abstract; col. 4, lns. 10-30; col. 5, lns. 15-25; col. 9, lns. 22-30. Batchelder does not disclose that the "impeller [has] a plurality of curved blades, [wherein] the curvature of the blades [is] configured to increase an efficiency of the impeller when rotating in a predetermined rotational direction," and that the "pump [includes] an AC motor ... [wherein] an AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor." Batchelder also does not also disclose that "a characteristic of

the AC voltage directed to the motor during starting of the motor [is] selected to rotate the impeller in the predetermined rotational direction."

Chu discloses a cooling unit 10 that includes a reservoir 12 containing water and a tubing arrangement disposed on an outer wall of reservoir 12. A pump 16 is submerged in the water in the reservoir to circulate the water through the tubing. The pump 16 of Chu is coupled to a motor 26 also disposed within the reservoir. Motor 26 also drives a fan 20 that is configured to blow air through the tubing. See Chu, Fig. 1, para. 0011. The water in the reservoir is circulated through a cold plate 66 that is thermally coupled to electronic circuitry 68 that generates heat. The water circulating between the cold plate and the cooling unit 10 removes the heat generated by the electronic circuitry 68. See Chu, Fig. 5, para. 0023. Chu does not disclose, teach, or suggest an "impeller [having] a plurality of curved blades, [wherein] the curvature of the blades [is] configured to increase an efficiency of the impeller when rotating in a predetermined rotational direction," and a pump that "[includes] an AC motor ... [wherein] an AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor." Chu does not also disclose, teach, or suggest that "a characteristic of the AC voltage directed to the motor during starting of the motor [is] selected to rotate the impeller in the predetermined rotational direction."

In the Office Action, Alvaro was used for the teaching of "a means to detect an angular position of the rotor." This limitation has been cancelled from amended claim 70. Alvaro discloses a device for controlling a synchronous electric motor having a permanent magnet rotor to remedy starting torque issues and other issues associated

with such motors. See, Alvaro, Abstract, col. 1, lns 22-41. The device of Alvaro includes a stator having windings disposed around a stack of laminations and a hall effect sensor 10 configured to detect an instantaneous position of the rotor. Current is caused to flow in the stator windings of Alvaro in a direction that depends on the polarity of the voltage and an instantaneous position of the rotor. See Alvaro, Abstract, col. 3, lns. 37-42. Alvaro does not disclose an "impeller [having] a plurality of curved blades, [wherein] the curvature of the blades [is] configured to increase an efficiency of the impeller when rotating in a predetermined rotational direction," and a pump "[having] an AC motor ... [wherein] an AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor." For at least these reasons, amended claim 70 is allowable over Batchelder in view of Chu and Alvaro.

Although claims 97 and 99 have been cancelled by this response, Applicant addresses the rejection of these claims since recitations similar to those in cancelled claims 97 and 99 have been incorporated in amended claim 70. In the rejection of claims 97 and 99, the Examiner admits that Batchelder in view of Chu and Alvaro does not disclose an "impeller having curved blades which would be more efficient when rotated in a particular direction [as recited in cancelled claim 97], the pump rotor being powered by ... an AC motor powered by a DC power supply [as recited in cancelled claim 99]." See Office Action, pg. 7. The Examiner rejects claim 99 by alleging that it is conventional in the computer cooling art to use AC motors powered by DC power supplies, and therefore, it would have been obvious to use an AC motor powered by a

DC power supply in the cooling system of Batchelder in view of Chu "to enable battery operation of a computer." Id.

Contrary to the Examiner's assertion, it is not conventional in the computer cooling art to use AC motors powered by the computer system's DC power supply. As described in the specification of the current application, "it has never been and never will be the choice of the person skilled in the art to use an AC motor. [Since] [t]he voltage supplied by the voltage supply of the computer system itself is DC, [] it will be the type of voltage chosen by the skilled person." See Specification, para. 015. The power supply of a computer system converts AC current from the mains to DC current that is used to power different components of the computer. To power the motor of a pump associated with the cooling system of the computer, a person of ordinary skill in the art would use a DC pump that may be powered by the same power supply. Furthermore, as pointed out by the Examiner (see previous paragraph), it may be desirable to enable "battery operation of the computer" in the cooling system of Batchelder in view of Chu and Alvaro. A battery also outputs DC current. Therefore, a person of ordinary skill in the art would not be motivated to use an AC motor to power the pump.

In the Office Action, the Examiner rejects claim 97 alleging that it would have been obvious to one of ordinary skill in the art, to provide the cooling system of Batchelder as modified by Chu and Alvaro with an impeller having curved blades, as taught by Hsieh, to enable a more compact flow path. See Office Action, pg. 7. Hsieh discloses a heat radiating device 3 for a notebook computer with a fan 40 having curved fan blades 410 that will produce an air flow pattern that increases the heat radiating

efficiency of device 3. See Hsieh, col. 2, lns. 60-65. Hsieh does not teach or suggest that the teaching of a curved fan blade would be applicable to an impeller of a pump. A person of ordinary skill in the art would not be motivated to incorporate curved blades in an impeller of a pump from the teaching of curved air fan blades in Hsieh.

Even if curved blades were incorporated in the cooling system of Batchelder as modified by Chu and Alvaro and further modified to have an AC motor, none of the prior art teach or suggests that the "AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor" and that "a characteristic of the AC voltage directed to the motor during starting of the motor [is] selected to rotate the impeller in the predetermined rotational direction," as recited in amended claim 70. In a typical AC motor, since the direction of an AC current reverses cyclically, the direction of rotation of the impeller would depend upon the direction of current to the motor as the motor is started. In the cooling system as recited in claim 70, although the impeller is driven by an AC motor, the curved impeller is rotated in a predetermined rotational direction so that the efficiency of the impeller is increased.

As described in the specification, operating the cooling system with an impeller having blades designed for rotation in one direction and driving the impeller using an AC motor, where the AC voltage for the motor is obtained by converting the DC voltage output of the computer power supply to AC voltage, and where a characteristic of the AC input to the impeller during starting of the impeller is selected to rotate the impeller in that one direction, "ensures the most efficient circulation of cooling liquid in the

cooling system and at the same time ensures the lowest possible energy consumption of the electric motor driving the impeller." Specification, para. 027-028.

For at least these reasons, amended claim 70 is also allowable over Batchelder, Chu, Alvaro, and Hsieh, alone or in combination. Claims 71-73, 75-84, and 87 depend from claim 70, and are also allowable over the cited prior art references at least for the same reason that claim 70 is allowable. Therefore, it is respectfully requested that the 35 U.S.C. §103(a) rejection of claims 70, 72, 73, 75-84, and 87 be withdrawn.

Rejections of claims 74

Claim 74 stands rejected as being unpatentable under 35 U.S.C. §103(a) as being obvious over Batchelder in view of Chu and Alvaro and further in view of Morris. Applicant traverses this rejection. Claim 74 depends from claim 70. Morris does not remedy the deficiencies of Batchelder, Chu, and Alvaro discussed earlier. Therefore, claim 74 is allowable over Batchelder in view of Chu and Alvaro and further in view of Morris for the same reason that amended claim 70 is allowable over Batchelder in view of Chu and Alvaro. Therefore, it is respectfully requested that the 35 U.S.C. §103(a) rejection of claim 74 be withdrawn.

Rejections of claims 85, 86, and 88

Claims 85, 86, and 88 stand rejected under 35 U.S.C. §103(a) as being obvious over Batchelder in view of Chu and Alvaro and further in view of Bingler. Applicant traverses these rejections. Claims 85, 86 and 88 depend from claim 70. Bingler does not remedy the deficiency of Batchelder, Chu, and Alvaro discussed above. Therefore, it is respectfully requested that the 35 U.S.C. §103(a) rejection of claims 85, 86, and 88 be withdrawn.

Rejections of claims 97-100 and 103-112

Of these claims, claims 97-102 have been cancelled by this response, and claims 103-112 stand rejected under U.S.C. §103(a) as being unpatentable over Batchelder in view of Chu and Alvaro and further in view of Hsieh. Among these claims, claims 103 and 108 are independent. Claims 104-107 dependent from claim 103, and claims 109-112 depend from claim 108.

Amended independent claim 103 recites, among others, a "pump including an AC motor ... [with] the impeller being mechanically coupled to the rotor and ... [wherein] an AC voltage to operate the motor [is] obtained by converting a DC voltage output of a DC power supply of the computer system to the AC voltage for the motor." Amended independent claim 108 recites, a method of operating a cooling system that includes, among others, a pump having a motor with an "impeller mechanically coupled to a rotor of the motor," and wherein the motor is started "by applying an AC voltage to the motor, the AC voltage obtained by coverting a DC voltage output of a DC power supply of the computer system to the AC voltage, a characteristic of the AC voltage directed to the motor being selected based on at least the detected angular position and the predetermined rotational direction."

As described with reference to the rejection of independent claim 70, Batchelder, Chu, Alvaro, and Hsieh, do not teach or suggest, alone or in combination, these recited limitations. At least for this reason, independent claims 103 and 108 are allowable over Batchelder in view of Chu and Alvaro and further in view of Hsieh. Dependent claims 104-107 and 109-112 are allowable over Batchelder in view of Chu and Alvaro and

further in view of Hsieh at least for the same reason that their respective independent claims are allowable over these references.

Although not used in any rejections, the Examiner states that Kunz (DE 195 34 423) ("Kunz")is pertinent to the current disclosure since it teaches a rotor with a position detector. See Office Action, page 8. Applicant assumes that the Examiner cites this publication to show the teaching of an angular position sensor of the rotor (as previously recited in independent claim 70). Kunz discloses a device for controlling the startup of a single phase synchronous motor using a sensor 10 that detects the angular position of the rotor. Kunz, Translated Abstract, page 7. The recitation of the means to detect an angular position of rotor has been cancelled from claim 70 by this response, and Kunz does not cure any of the deficiencies of Batchelder, Chu, and Alvaro.

CONCLUSION

In view of the above remarks, Applicant respectfully submits that claims 70-89, 95, and 103-112 are in condition for allowance. Accordingly, Applicant respectfully requests reconsideration and re-examination of this application and the timely allowance of the pending claims.

The Office Action contains characterizations of the claims and the related art, with which Applicant does not necessarily agree. Unless expressly noted otherwise, Applicant declines to subscribe to any statement or characterization in the Office Action.

Applicant respectfully requests that the Examiner contact the undersigned, Eric P. Raciti, if he considers that the present response does not overcome the prior art of record. The undersigned can be reached at (617) 452-1675.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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/Eric P. Raciti/

Dated: December 18, 2008 By:_____
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